

What is claimed is:

1. In a tandem image forming device comprising a plurality of image forming means arranged side by side and each comprising a developing device and a cleaning device arranged around an image carrier, one of nearby ones of said plurality of image forming means has said cleaning device thereof positioned above said developing device of the other image forming means.

2. An image forming apparatus comprising:

an intermediate image transfer body implemented as a belt; and

a tandem image forming device comprising a plurality of image forming means arranged side by side in a direction in which said intermediate image transfer body extends, said plurality of image forming means each comprising a developing device and a cleaning device arranged around an image carrier;

wherein one of nearby ones of said plurality of image forming means has said cleaning device thereof positioned above said developing device of the other image forming means.

3. The apparatus as claimed in claim 2, wherein said plurality of image forming means are distributed above and below said intermediate image transfer body.

4. The apparatus as claimed in claim 3, further

comprising a transfer body cleaning device positioned above said developing device included in one image forming device that is located at an end.

5. The apparatus as claimed in claim 4, wherein said image forming means each further comprises a primary image transfer device.

6. The apparatus as claimed in claim 5, further comprising a controller for outputting an emergency stop command when an error occurs.

7. The apparatus as claimed in claim 6, further comprising bias applying means for applying, from a time when said controller outputs the emergency stop command to a time when said transfer body cleaning device removes toner already transferred to said intermediate image transfer body, a bias to a downstream, primary image transfer device for causing said toner to move from said image carrier to said intermediate image transfer body.

8. The apparatus as claimed in claim 7, wherein said bias applying means comprises primary image transfer bias forming means for forming a primary image transfer bias at said primary image transfer device to thereby effect primary transfer of a toner image from said image carrier to said intermediate image transfer body.

9. The apparatus as claimed in claim 8, wherein said intermediate image transfer body comprises an elastic

layer and a smooth, coating layer covering a surface of said elastic layer.

10. The apparatus as claimed in claim 9, wherein said elastic layer is not flexible in a circumferential direction of said intermediate image transfer body, but is elastic at at least a surface thereof and subjected to a pressure by secondary transfer.

11. The apparatus as claimed in claim 10, wherein a secondary image transfer device for transferring the toner image from said intermediate image transfer body to a recording medium is positioned below a range over which said intermediate image transfer body extends.

12. The apparatus as claimed in claim 11, wherein a fixing device for fixing the toner image transferred to the recording medium is entirely or partly positioned below said range.

13. The apparatus as claimed in claim 11, wherein said secondary image transfer device comprises an endless belt playing the role of a conveyor for conveying the recording medium to said fixing device at the same time.

14. The apparatus as claimed in claim 11, wherein said intermediate image transfer body extends over a length smaller than a length of said tandem image forming device, as measured in the direction in which said intermediate image transfer body extends.

15. The apparatus as claimed in claim 2, further comprising a transfer body cleaning device positioned above said developing device included in one image forming device that is located at an end.

16. The apparatus as claimed in claim 15, wherein said image forming means each further comprise a primary image transfer device.

17. The apparatus as claimed in claim 16, further comprising a controller for outputting an emergency stop command when an error occurs.

18. The apparatus as claimed in claim 17, further comprising bias applying means for applying, from a time when said controller outputs the emergency stop command to a time when said transfer body cleaning device removes toner already transferred to said intermediate image transfer body, a bias to a downstream, primary image transfer device for causing said toner to move from said image carrier to said intermediate image transfer body.

19. The apparatus as claimed in claim 18, wherein said bias applying means comprises primary image transfer bias forming means for forming a primary image transfer bias at said primary image transfer device to thereby effect primary transfer of a toner image from said image carrier to said intermediate image transfer body.

20. The apparatus as claimed in claim 19, wherein

said intermediate image transfer body comprises an elastic layer and a smooth coating layer covering a surface of said elastic layer.

21. The apparatus as claimed in claim 20, wherein said elastic layer is not flexible in a circumferential direction of said intermediate image transfer body, but is elastic at at least a surface thereof and subjected to a pressure by secondary transfer.

22. The apparatus as claimed in claim 21, wherein a secondary image transfer device for transferring the toner image from said intermediate image transfer body to a recording medium is positioned below a range over which said intermediate image transfer body extends.

23. The apparatus as claimed in claim 22, wherein a fixing device for fixing the toner image transferred to the recording medium is entirely or partly positioned below said range.

24. The apparatus as claimed in claim 22, wherein said secondary image transfer device comprises an endless belt playing the role of a conveyor for conveying the recording medium to said fixing device at the same time.

25. The apparatus as claimed in claim 22, wherein said intermediate image transfer body extends over a length smaller than a length of said tandem image forming device, as measured in the direction in which said

intermediate image transfer body extends.

26. The apparatus as claimed in claim 2, further comprising:

a sensor located on a sheet conveyance path for sensing a leading edge of a recording medium; and

a registration roller pair preceding an image transfer position for correcting a skew of the recording medium.

27. The apparatus as claimed in claim 26, wherein exposure for exposing said image carrier begins on the basis of a time at which said sensor senses the leading edge of the recording medium, and

said registration roller pair starts conveying the recording medium to the image transfer position in synchronism with completion of an image forming operation.

28. The apparatus as claimed in claim 27, wherein said sensor comprises a sheet sensor adjoining an outlet of a sheet cassette.

29. The apparatus as claimed in claim 27, wherein said sensor comprises a jam sensor located on the sheet conveyance path at a distance greater than a distance between an exposure position and the image transfer position assigned to said image carrier.

30. The apparatus as claimed in claim 2, further comprising:

a sensor located on the sheet conveyance path for sensing a leading edge and a trailing edge of the recording medium; and

a registration roller pair preceding an image transfer position for correcting a skew of a recording medium.

31. The apparatus as claimed in claim 30, wherein in a repeat print mode, exposure for exposing said image carrier begins on the basis of a time at which said sensor senses the leading edge of a preceding recording medium,

a following recording medium begins to be fed in a preselected period of time since said sensor has sensed the trailing edge of the recording medium, and

said registration roller pair starts conveying the recording medium to the image transfer position in synchronism with completion of an image forming operation.

32. The apparatus as claimed in claim 31, wherein said sensor comprises a sheet sensor adjoining an outlet of a sheet cassette.

33. The apparatus as claimed in claim 31, wherein said sensor comprises a jam sensor located on the sheet conveyance path at a distance greater than a distance between an exposure position and the image transfer position assigned to said image carrier.

34. The apparatus as claimed in claim 2, further

comprising:

a sensor located on the sheet conveyance path for sensing a leading edge of a recording medium fed by a feeding operation, which occurs at a preselected interval;

a registration roller pair preceding an image transfer position for correcting a skew of a recording medium.

35. The apparatus as claimed in claim 34, wherein in a repeat print mode, exposure for exposing said image carrier begins on the basis of a time at which said sensor senses the leading edge of the recording medium, and

said registration roller pair starts conveying the recording medium to the image transfer position in synchronism with completion of an image forming operation.

36. The apparatus as claimed in claim 35, wherein said sensor comprises a sheet sensor adjoining an outlet of a sheet cassette.

37. The apparatus as claimed in claim 35, wherein said sensor comprises a jam sensor located on the sheet conveyance path at a distance greater than a distance between an exposure position and the image transfer position assigned to said image carrier.

38. The apparatus as claimed in claim 2, wherein said image forming means each form a respective image in a single color, and

images formed by said image forming means are combined to form a composite color image.

39. The apparatus as claimed in claim 2, wherein two image forming means are arranged side by side and each forms a respective image in a single color, and

images formed by said two image forming means are combined to form a bicolor image.

40. The apparatus as claimed in claim 2, wherein said image forming means each are entirely or partly constructed into a process cartridge.

41. The apparatus as claimed in claim 2, wherein said developing device uses a two-ingredient type developer consisting of carrier and toner and comprises an agitating section for conveying the developer while agitating said developer to thereby deposit said developer on a sleeve, and a developing section for transferring the toner deposited on said sleeve to the image carrier, and

said agitating section is positioned at a lower level than said developing section with said cleaning device overlying said agitating section.

42. The apparatus as claimed in claim 41, wherein said agitating section comprises two parallel screws while said developing section comprises said sleeve.

43. The apparatus as claimed in claim 2, wherein use is made of a developer having a weight mean grain size of

4. μm to 15 μm .

44. The apparatus as claimed in claim 2, wherein said cleaning device comprises a cleaning blade and a fur brush.

45. The apparatus as claimed in claim 44, wherein said cleaning device further comprises an electric field roller for applying a bias to said fur brush.

46. The apparatus as claimed in claim 2, wherein said image forming means each further comprise a charger for charging said image carrier in contact with said image carrier.

47. The apparatus as claimed in claim 2, further comprising a fixing device implemented as an endless belt for fixing a toner image formed on a recording medium.

48. The apparatus as claimed in claim 2, further comprising a turning device extending in parallel to said tandem image forming device for turning, in a duplex print mode, a recording medium in order to form a toner image on both sides of said recording medium.

49. An image forming apparatus comprising:

a sheet conveyance path; and

a tandem image forming device comprising a plurality of image forming means arranged side by side along said sheet conveyance path, said plurality of image forming means each comprising a developing device and a cleaning device arranged around an image carrier;

wherein one of nearby ones of said plurality of image forming means has said cleaning device thereof positioned above said developing device of the other image forming means.

50. The apparatus as claimed in claim 49, wherein said image forming means each form a respective image in a single color, and

images formed by said image forming means are combined to form a composite color image.

51. The apparatus as claimed in claim 49, wherein two image forming means are arranged side by side and each forms a respective image in a single color, and

images formed by said two image forming means are combined to form a bicolor image.

52. The apparatus as claimed in claim 49, wherein said image forming means each are entirely or partly constructed into a process cartridge.

53. The apparatus as claimed in claim 49, wherein said developing device uses a two-ingredient type developer consisting of carrier and toner and comprises an agitating section for conveying the developer while agitating said developer to thereby deposit said developer on a sleeve, and a developing section for transferring the toner deposited on said sleeve to the image carrier, and said agitating section is positioned at a lower level

than said developing section with said cleaning device overlying said agitating section.

54. The apparatus as claimed in claim 53, wherein said agitating section comprises two parallel screws while said developing section comprises said sleeve.

55. The apparatus as claimed in claim 49, wherein use is made of a developer having a weight mean grain size of 4 μm to 15 μm .

56. The apparatus as claimed in claim 49, wherein said cleaning device comprises a cleaning blade and a fur brush.

57. The apparatus as claimed in claim 56, wherein said cleaning device further comprises an electric field roller for applying a bias to said fur brush.

58. The apparatus as claimed in claim 49, wherein said image forming means each further comprise a charger for charging said image carrier in contact with said image carrier.

59. The apparatus as claimed in claim 49, further comprising a fixing device implemented as an endless belt for fixing a toner image formed on a recording medium.

60. The apparatus as claimed in claim 49, further comprising a turning device extending in parallel to said tandem image forming device for turning, in a duplex print mode, a recording medium in order to form a toner image

on both sides of said recording medium.

61. In a method of arranging a plurality of image forming means, each of which comprises a developing device and a cleaning device arranged around an image carrier, side by side in a tandem image forming device, one of nearby ones of said plurality of image forming means has said cleaning device thereof positioned above said developing device of the other image forming means.